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| 10/660,819 | 09/09/2003 | Xinguo Liu | MCS-039-03 (MS 305148.02) | 7045 |
| 27662 7590 09/05/2007 MICROSOFT CORPORATION C/O LYON & HARR, LLP 300 ESPLANADE DRIVE SUITE 800 OXNARD, CA 93036 | | | EXAMINER BAYAT, ALI | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/660,819

Applicant(s)

LIU ET AL.

Examiner

Ali Bayat

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-23 is/are allowed.
- 6) ☒ Claim(s) 1,4-8,10-12 and 24-27 is/are rejected.
- 7) ☒ Claim(s) 2,3 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11/11/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

Claim Rejections - 35 USC § 101

1. Claims 24-27 invention are directed to non-statutory subject matter.

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claim **[24]** is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim **[24]** defines a **[a computer-readable medium having computer-executable instructions]** embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory having a stored computer program

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and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV).

That is, the scope of the presently claimed **[a computer program, an algorithm, a medium, a program providing medium, a memory, etc – whatever is claimed]** can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" or equivalent in order to make the claim statutory. Examiner suggestion "a computer-readable medium having a stored computer program for measuring the similarity between geometric models of objects using directional histogram models of the objects, said computer program comprising:" Any amendment to the claim should be commensurate with its corresponding disclosure.

Therefore claims 25-27 is also rejected less than 35 USC 101. Because they are depended from rejected claim 24.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,4,7-8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rico et al. (Pub. No. US 2006/0167355) in view of Carson (US 4,277,684).

In regard to claim 1, Rico provides for a computer-implemented process for generating a representation of an object (Para.18), comprising using a computer to perform the following process actions: for a prescribed number of directions (Fig.4 element 15 Para: 41 lines 4-11), determining the thickness of the object along each of a prescribed number of parallel rays directed through the object in the direction under consideration (Para.44 note the line 501 of Fig.5 allows direct conversion from logarithmic gray pixel value to thickness value), normalizing the determined thickness values (Para.46 lines 6-8), and generating a thickness histogram from the normalized values (Fig.6 Para.47; wherein the thickness histograms associated with the prescribed directions define a directional histogram model of the object which is employed as a representation of the object that is substantially invariant in regard to translation and scaling (Para.44 note the line 501 of Fig.5 allows direct conversion from logarithmic gray pixel value to thickness values). Rico does not provide for a prescribed number of parallel rays. Carson provides for a prescribed number of parallel rays (Fig.4, col.4 lines 45-51). It would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Carson with the system and method of Rico to reduce the unnecessary radiation dose to the patient and system noise from scattered X-ray photons, by applying the parallel rays. Col.1 lines 34-41).

With regard to claims 4,7-8, see the rejection of claim 1. They recite similar

limitations as claim 1. Hence they are similarly analyzed and rejected.

As to claim 11, Rico provides for the process, wherein the object is a 2 dimensional object (Fig.2).

With regard to claim 12, Rico provides for the process, wherein the object is a 3 dimensional object (para.11)

In regard to claim 10, Rico as modified by Carson provides for parallel x-rays (Fig.4), where each ray corresponds to a direction. However it is a matter of design choice to have exactly 256 parallel rays. Therefore it would have been obvious to a person of ordinary skill in the art to limit the X-rays beams, for the benefit of her/his invention, to reduce the unnecessary radiation dose to the object.

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rico et al. (Pub. No. US 2006/0167355) in view of Carson (US 4,277,684), further in view of Itagaki et al. (Pub. No. US 2001/0051005).

Rico as modified by Carson does not provide for quantizing the thickness values, further wherein the thickness values are quantized into 64 integer values. Itagaki provides for quantizing the thickness values, which are quantized into 64 integer values (Para.4, see 8 times 8 pixel blocks are converted to Dc value, and further the information amount is reduced by quantizing the coefficient values): It would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Rico as modified by Carson with the system and method of Itagaki to reduce the amount of information by quantizing the coefficient value in a different quantization width within no reduction of image quality. See Para.4.

Objected Claims

3. Claims 2-3 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Allowed Claims

4. Claims 13-23 are allowed.

Reason For Allowance

3. The following is an examiner's statement of reasons for allowance:

the prior art of Rico as modified by Carson failed to teach or suggest for "(g) normalize the computed distance values, (h) construct a thickness histogram for the selected sampling direction using the normalized distance values, (i) repeat program modules (a) through (h) for all the remaining previously unselected sampling directions, (j) designate the thickness histograms constructed for the selected sampling directions as a directional histogram model of the object". As cited in claims 13. Further Rico as modified by Carson failed to teach or suggest for "designating the normalized thickness histograms associated with the prescribed directions as a directional histogram model of the object; characterizing the directional histogram model as a number of spherical functions defined on a unit sphere; performing a spherical harmonic transform of the characterized histogram model to produce a matrix descriptor which is employed as a representation of the object that is substantially invariant in regard to translation, scaling, and rotation; and computing a distance measurement between the matrix descriptors of the objects being measured for similarity, wherein the distance

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measurement is indicative of the degree of difference between the matrix descriptors of the objects". As cited in claim 18.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ali Bayat whose telephone number is 571-272-7444. The examiner can normally be reached on M-F 9:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Ali Bayat *AB*
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8/27/07

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